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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,972	09/30/2003	Ali A. Said	30256/39669	7676

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EXAMINER	
ANGEBRANNDT, MARTIN J	
ART UNIT	**PAPER NUMBER**
1756	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/676,972	SAID ET AL.	
	Examiner	Art Unit	
	Martin J. Angebranndt	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/29/06 & 1/30/07*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-16,30-42 and 51-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-16,30-42 and 51-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/30/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The restriction requirement of 7/1/2005 is incorporated by reference to that action here without repeating it. The applicant states that claims 52-56 are not within the scope of the elected species. The examiner disagrees with this position and withdraws the election requirement. The active claims are all grouped together as the subject matter bounded by them has converged. Response to the arguments appears after the first rejection to which they are directed.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-16 and 51-56 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear if this controlling is active (ie. during the scan/movement) or merely chosen prior to scanning/movement. Also it is not clear if the controlling is a maintenance of the polarization relative to the propagation axis.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1,3-12,15-16,30,32-38,41,42,51 and 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borrelli et al. '452, in view of Fukuyo et al. WO 02/22301 (EP 1338371 is used as English equivalent).

Borrelli et al. '452 teach with respect to figure 2, seven serial passes of the laser beam, which results in a larger cross sectional area for the waveguide and is exemplified in example A where a spacing of 0.5 micron is taught [0039-0043,0056-0058]]. The use of the same technique to form waveguides with elliptical cross-sections is disclosed. [0044]. The use of a helical motion is disclosed and exemplified in example B the spot size was 2 microns and a 3.5 micron by 6.5 microns waveguide was formed [0048-0051,0059-0060]. The use of a plurality of beams to simultaneously form the desired multiple beams and the scanning of these together is disclosed. (figure 10 and [0052]) The modification of translation rate, spot focus size, repetition rate, pulse energy, wavelength, focusing and offset can be varied and the formation of tapered features is disclosed [0041,0045,0049,0054].

Fukuyo et al. (WO 02/22301); [EP 1338371] teaches the use of polarized light in two photon (multiphoton) laser processing. The polarization is such that the major axis of the ellipse is oriented in the direction of the cut/laser processing. (9/24-10/6; [0038]). The rotation of the polarization is taught.(10/23-11/5; [0042]). Having the polarization oriented in this way enables laser cutting without generating melt or undesired fractures.(11/14-19; [0044]). Linear polarization is a subset of elliptical polarization where the ellipticity is zero (7/5-8/9; [0024-0027]). The processing of various materials including glasses is disclosed. (4/8-17; [0013]).

It would have been obvious to one skilled in the art to modify the process of Borrelli et al. '452 by using laser pulses which are elliptically polarized with the major axis of polarization being oriented in the direction of the scan/line being cut as taught by Fukuyo et al. WO 02/22301 with a reasonable expectation of decreasing artifacts/defects, such as melting and/or undesired fractures. Further it is clear that the scanning direction is in the axial direction of the waveguide.

In response to the applicant's arguments, the examiner notes that the added limitation is taught by Fukuyo et al. EP 1338371 as are the benefits ascribed to this by the applicant (see the instant specification at 17/23-28 and 18/15-19). The examiner further notes that all of these techniques are laser machining using multiphoton processes to form patterns in glasses and the like and as such as clearly analogeous. Clearly in any laser processing the appearance of undesired cracks in the materials (glass or otherwise) would be undesirable and Fukuyo et al. EP 1338371 teaches this specifically with respect to multiphoton absorption processing.

6. Claims 1,3-16,30,32-42,51 and 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borrelli et al. '452 and Fukuyo et al. WO 02/22301, in view of Hirao et al. "Writing waveguides and gratings in silica and related materials by a femtosecond laser", J. Noncryst. Sol. Vol. 239 pp. 91-95 (1998).

Hirao et al. "Writing waveguides and gratings in silica and related materials by a femtosecond laser", J. Noncryst. Sol. Vol. 239 pp. 91-95 (1998) teaches the rescanning over the same path for 10 passes (scanning number :10 in figure 3 (see page 92,right column).

To address the embodiments bounded by the claims, but not rendered obvious above, the examiner holds that it would have been obvious to one skilled in the art to modify the processes rendered obvious by the combination of Borrelli et al. '452 and Fukuyo et al. WO 02/22301 by scanning some of the paths more than once, based upon the direction relating to the varying the offset and based upon the disclosed that this is known within the fs laser waveguide formation art as disclosed by Hirao et al. "Writing waveguides and gratings in silica and related materials by a femtosecond laser", J. Noncryst. Sol. Vol. 239 pp. 91-95 (1998), who exemplifies 10 overscans.

7. Claims 1,3-16,30-42 and 51-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dugan et al. '850, in view of Fukuyo et al. WO 02/22301.

Dugan et al. '850 disclose an invention similar to that claimed where ultrashort laser pulses are used to form waveguides. These include lasers with pulse widths of less than 100 fs and powers in the nJ or microJoule range. (5/17-30). The use of these techniques in trimming by exposure either within or adjacent to waveguides and in either transverse or axial directions and the use of an unpolarized beam is disclosed. (5/31-51). The pulses are preferably at a wavelength at which the material is transparent (6/18-43) and multiphoton is disclosed as causing the changes in the absorption profile. (7/1-25). The movement of the confocal volume of the beams during exposure either axially or longitudinally to expose the desired volume using translational stages, shifting of the focus and computer control is disclosed (7/43-8/40). The use of translation of the beams to form transitions between circular and square waveguiding portion is disclosed. (16/8-22). The repeated scanning of areas is taught throughout (see eg 18/62-19/28). The formation of curves in the waveguides is shown in figures 8a-c.

It would have been obvious to one skilled in the art to modify the process resulting from the combination of Dugan et al. '850 by using a linearly polarized beam, taught by Fukuyo et al. WO 02/22301 with a reasonable expectation of decreasing artifacts/defects, such as melting and/or undesired fractures. Further it is clear that the scanning direction is in the axial direction of the waveguide and that curved waveguides are embraced by these teachings.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Martin J Angebranndt
Primary Examiner
Art Unit 1756

03/12/2007